

**REMARKS****I. INTRODUCTORY REMARKS**

The Applicant thanks the Examiner for the careful consideration of this application. The Office Action dated January 22, 2009 has been received and its contents carefully considered. Applicant amends claims 1 -13. Claims 1-13 are currently pending in this application. Based on the foregoing amendments and the following remarks, the Applicant respectfully requests that the Examiner reconsider all outstanding objections and rejections and that they be withdrawn.

**II. PRIORITY**

On page 2, the Action notes that the Applicant has not filed a certified copy of the German application as required by 35 U.S.C. §119(b). On March 19, 2009, Applicant submitted Form PCT/IB/304 and requested the U.S. Patent and Trademark Office to request the International Bureau to electronically transmit an official copy of the priority application, EP 03012198.2, to the U.S. Patent and Trademark Office. Applicant respectfully submits that with the submission of Form PCT/IB/304, the Applicant has fulfilled the requirements of 35 U.S.C. §119. Applicant herewith requests confirmation of receipt of the certified copy of the priority document with the PTO.

**III. INFORMATION DISCLOSURE STATEMENT**

On page 2, the Action provides that legible copies of the unconsidered references were not provided. Applicant submits that legible copies of the documents should have been forwarded by WIPO under an International Exchange program under an exchange

program between the PTO, the EPO, and the JPO which was then in place. Nevertheless, Applicant herewith includes copies of the references and lists the references in the Information Disclosure Statement concurrently submitted.

#### **IV. AMENDMENTS TO THE SPECIFICATION**

Applicant amends the specification to place the specification in compliance with U.S. patent practice. Applicant eliminates any reference to the claims in the specification and also clearly refers to Figure 1.

#### **V. CLAIM REJECTIONS UNDER 35 U.S.C. §112**

On pages 2-3 of the Office Action, claims 10-13 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. More specifically, the Action rejects claims 10 and 12 for using the phrase “can be.” With this Amendment, Applicant removes the phrase. In view of the above, it is believed that claims 10-13, as amended, are clear and definite within the meaning of 35 U.S.C. § 112, second paragraph. The Applicant therefore respectfully requests that the rejections under 35 U.S.C. § 112, second paragraph, be reconsidered and withdrawn.

#### **VI. CLAIM REJECTIONS UNDER 35 U.S.C. § 102(b)**

On page 3, the Office Action rejects claims 1-3 and 8 under 35 U.S.C. § 102(b) as being anticipated by the article *Comparison of ellipsometric methods for separate determination of thickness and optical constants of thin films* by Bortchagovsky et al.

Further on page 4, claims 10-12 are rejected under §102(b) as being anticipated by U.S.

Patent No. 3,963,348 by Nakantani et al. The rejection is respectfully traversed.

Nevertheless, by this Amendment, Applicant amends claim 1 to more particularly recite the features of the invention in order to expedite prosecution. Claims 2-3, 8 and 10-12 depend from independent claim 1 and overcome the §102(b) rejection for at least the same reasons.

**A. CLAIM 1**

Applicant amends claim 1 to recite “a method for three-dimensionally determining the refractive index of transparent or partially transparent layers via **transmission** ellipsometrie, comprising: inserting the layer in **an immersion medium** which has a higher refractive index than air” (Emphasis Added). Applicant respectfully submits that Bortchagovsky et al. fail to disclose at least the above features as recited in amended claim 1.

Applicant respectfully submits that Bortchagovsky et al refers to reflection ellipsometrie and not transmission ellipsometrie. The difference between reflection ellipsometrie and transmission ellipsometrie is important for the understanding of the surprising effect of the present invention. In technical literature, the term “ellipsometrie” is commonly used for “reflection ellipsometrie,” in which the reflected portion of the light is measured. Usually, reflection ellipsometrie is known to have a higher accuracy when determining the refractive index than transmission ellipsometrie. Therefore, the skilled person would use reflection ellipsometrie and try to improve this measurement type to get a higher accuracy. The Applicant’s use of transmission ellipsometrie in

connection with an appropriate immersion medium surprisingly increases the accuracy in the determination of the three-dimensional refractive index at different incident angles by two orders of magnitude, compared with a measurement using transmission ellipsometrie without immersion medium (See Applicant application, paragraph [0002]). This steep increase by two orders of magnitude is not foreseeable and therefore surprising for the ordinarily skilled person.

Bortchagovsky et al. disclose the *Comparison of Ellipsometric Methods for Separate Determination of Thickness and Optical Constants of Thin Films*. However, Bortchagovsky et al. describe conventional reflection ellipsometrie, in this paper even though Bortchagovsky et al only refers to "ellipsometrie." The use of reflection ellipsometrie instead of transmission ellipsometrie can be recognized by the skilled person by reviewing the equations, diagrams and also the text of this document. The equations do not include the thickness of the substrate on which the thin layer is applied. The thickness of the substrate, however, is important when performing transmission ellipsometrie but is not required when performing reflection ellipsometrie. Furthermore, Bortchagovsky et al. clearly compare the effect of different substrates, a substrate of silicon and another substrate having a very high absorption (See Bortchagovsky et al, table of page 127). A highly absorbing substrate cannot be used in transmission ellipsometrie but only in reflection ellipsometrie. Therefore, the comparison clearly refers to reflection ellipsometrie. The same can be recognized from page 128, third paragraph of Bortchagovsky et al., in which a possibility of using ultraviolet light for which the silicon substrate has very high absorption, is proposed—"even if we use it for

measurements in ultraviolet where it was very high absorption.” This also is only possible using reflection ellipsometrie and not transmission ellipsometrie.

Furthermore, Figure 1 on page 127 of Bortchagovsky et al. shows the dependence of the ellipsometric parameter Delta ( $\Delta$ ) from the angle  $\Psi$ . The value of  $\tan \Psi$  is the relation of the values of transmission or reflection coefficient of p and s light. In case of reflection ellipsometrie,  $\Psi$  is close to 0 as is the case in the diagram of Figure 1, whereas in case of transmission ellipsometrie,  $\Psi$  is close to 45°. The value of Delta ( $\Delta$ ) is also completely different, in case of reflection ellipsometrie as in Bortchagovsky et al. with values significantly higher than 100, whereas in case of transmission ellipsometrie this value is close to 0 (See Applicant’s Figure 4). This is also supported by the published doctoral thesis of Jung which shows in the left figure on page 84, experimental results for reflection ellipsometrie (See Jung, submitted herewith in IDS). It can be recognized that the results are similar in the range of values of Delta ( $\Delta$ ) to those of Figure 1 of Bortchagovsky et al. All these passages and figures clearly show that Bortchagovsky et al. refer to “reflection ellipsometrie” when speaking of “ellipsometrie” in general, as is also the case in many other publications in this field. Bortchagovsky et al., however, do not disclose the use of transmission ellipsometrie and do also not disclose the use of transmission ellipsometrie in combination with an immersion technique.

On the other hand, since reflection ellipsometrie is known to have a higher accuracy when three-dimensionally determining the refractive index (the same applies to reflection ellipsometrie in combination with a immersion technique) than transmission ellipsometrie, the skilled person would not suppose to achieve a higher accuracy when using transmission ellipsometrie with an immersion technique. Therefore, the invention

created unexpected results. Bortchagovsky et al. fail to disclose “a method for three-dimensionally determining the refractive index of transparent or partially transparent layers via **transmission** ellipsometrie, comprising: inserting the layer in **an immersion medium** which has a higher refractive index than air” (Emphasis Added).

Reconsideration and withdrawal of the rejection is respectfully requested in view of the foregoing amendments and remarks.

**B. CLAIMS 2-3 AND 8**

Claims 2-3 and 8 depend from independent claim 1 and overcome the §102(b) rejection for at least the same reasons as claim 1. Reconsideration and withdrawal of the rejection is respectfully requested in view of the foregoing amendments and remarks.

**C. CLAIMS 10 - 12**

Claims 10-12 are rejected under §102(b) as being anticipated by U.S. Patent No. 3,963,348 by Nakatani et al. Amended claim 10 provides, “a **support** for the immersion medium so that the sample is insertable within the immersion medium.” The Action aligns the bottle 1 of Nakatani with the claimed “sample.” The Action, however, fails to align the claimed “support” and “immersion medium” with comparable feature of Nakatani. Nakatani et al. appears to measure the light for the chamber itself and not a sample “within the immersion medium” of chamber (See Abstract of Nakatani). Nakatani fails to provide for an “immersion medium.” Nakatani fails to disclose “a support for the immersion medium so that the sample is insertable within the immersion medium” as recited in amended claim 10. The Action points to col. 2, lines 41-55 of Nakatani to

provide for cases in which the device of the invention may be used. The examples, however, relate to substances “inside” the bottle 1 and do not provide for a sample “insertable within the immersion medium” as recited by the claim. Reconsideration and withdrawal of the rejection is respectfully requested in view of the foregoing amendments and remarks.

Claims 11 and 12 depend from claim 10 and overcome the §102(b) rejection for at least the same reasons as claim 1. Reconsideration and withdrawal of the rejection is respectfully requested in view of the foregoing amendments and remarks.

### **VIII. CLAIM REJECTIONS UNDER 35 U.S.C. § 103(A)**

On pages 4-5 of the Office Action, claim 4 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Bortchagovsky et al and claims 5-9 are rejected as anticipated over Bortchagovsky et al as applied to claim 1 in view of T. Srikhirin et al. The Applicant respectfully traverses this rejection.

Claims 4 -9 depend from amended claim 1, which, as demonstrated above, is patentable over Bortchagovsky for at least the foregoing and following reasons. T. Srikhirin et all fails to remedy the deficiencies of Bortchagovsky. Neither Bortchagovsky nor T. Srikhirin render the claimed invention as obvious. Based on the foregoing, Applicant requests reconsideration and withdrawal of the §103(a) rejections.

**IX. CONCLUSION**

All of the stated grounds of objection and rejection have been properly traversed, accommodated, or rendered moot. Applicant, therefore, respectfully requests that the Examiner reconsider all presently outstanding objections and rejections and that they be withdrawn. Applicant believes that a full and complete reply has been made to the outstanding Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is hereby invited to telephone the undersigned at the number provided.

Prompt and favorable consideration of this Amendment is respectfully requested.

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